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15-C-98387

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1985

PHYSICIAN DRGs:
WHAT DO THEY LOOK LIKE AND HOW WOULD THEY WORK?

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February 25, 1985

REPORTS
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P482
1985

This research has been supported by Cooperative Agreement No. 15-C-98387/1-01 from the Health Care Financing Administration. The views and opinions in this report are the grantee's and no endorsement by HCFA or DHHS is intended or should be inferred.

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1.0 INTRODUCTION

1.1 What is a Physician DRG?

Under P.L. 98-21, the DHHS secretary was asked to report to Congress on "the advisability and feasibility of providing for determining the amount of the payments for physicians' services furnished to hospital inpatients based on the DRG type classification of the discharges of those inpatients". Since then, "physician DRGs" or "MD-DRGs" have gained considerable attention as an option for physician payment reform. But exactly what is a physician DRG? To a certain extent, MD-DRG is a misnomer for it implies that a casemix classification system was developed expressly for physicians. Rather, what is usually meant by MD-DRG is a prospective reimbursement system for inpatient physician services much like that currently used by Medicare for inpatient hospital care: a fixed case payment per hospital admission, where the size of the payment is determined by the patient's DRG. Under this approach, all services performed by physicians and normally billed as Part B services would be combined in a single bill and a single payment made.

Physician DRGs are an example of "packaging", of redefining the physician payment unit from a narrow procedure to a more comprehensive bundle of services. Surgeons have traditionally been reimbursed on a package basis, receiving a single payment for both the operation itself and normal post-operative care. Physician DRGs go a step further by packaging all other services provided during the hospitalization, such as anethesia, x-rays, and consultations.

Physician DRGs have considerable appeal for policymakers, in large part because they simultaneously control both physician prices and the number of services. They would encourage the physician to cut back on marginally necessary x-rays or consultations, for example, since their costs must come out of the fixed case payment. In addition, this approach would more closely align physicians' incentives with those of hospital administrators under the Medicare PPS.

In this study, for the first time, we examine physician DRGs, using actual cost and utilization data. What do they look like? How much do they cost? Who would win and who would lose under such a payment arrangement?

1.2 Overview of Methods

Hospital episodes were constructed from 1982 Medicare hospital and physician claims in four states: Michigan, New Jersey, North Carolina, and Washington. These states were chosen to represent each of the major regions. Hospital admissions were classified into DRGs using the Yale Grouper software, and physician (Part B) bills were then merged on at the patient stay level. These represented all physician services provided during the hospital stay.* The total sample size consisted of over 900,000 admissions, representing $744 million in Medicare physician outlays.

Mean physician DRG payments were determined simply by the average costs for all physician services provided during the hospital stay. Physician costs were defined as Medicare reasonable charges. Hospital costs by DRG were often included for comparison. These costs were based on submitted charges which were then adjusted to reflect Medicare operating costs using each hospital's Medicare Cost Report. For ease of presentation, we have referred to both the Part A and Part B components as costs. In both instances, costs represent what the Medicare program actually paid in 1982, including patient deductibles and copays.

For many analyses, the individual case (hospital admission) was the unit of observation, but for our simulations of potential winners and losers, we were interested in who would receive the DRG payment. For these analyses, we aggregated cases to the individual attending physician and the medical staff levels, respectively. Winners and losers were determined by comparing physician costs for each case in a given DRG with the DRG average for urban and rural areas, and then cumulating gains and losses across all cases and DRGs to arrive at a total gain (or loss). Since absolute gains (losses) will vary by size of practice, gains and losses were expressed on a per case basis for comparison across attendings (or medical staffs).

Finally, a similar approach was used to calculate changes in out-of-pocket liability under physician DRGs. It was assumed that beneficiary cost-sharing would equal 20 percent of the mean DRG payment. For beneficiaries with multiple hospitalizations, out-of-pocket payments were summed to represent total annual beneficiary liability for inpatient care.

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*For a complete, step-by-step description of how Part A and Part B claims were merged to construct an analytic file, see Mitchell _et al_., _Creating DRG-Based Physician Reimbursement Schemes_, Year 1 Report. Conducted under HCFA Grant No. 18-P-98387/1-01, October 1984.

2.0 PHYSICIAN DRGs EXPLAINED

2.1 How Much Does a Physician DRG "Cost"?

Table 2-1 presents mean physician DRG payments for 25 high-volume medical and surgical DRGs in our four states. Mean "payments" are simply the average Medicare reasonable charges for all physician services provided during the hospital stay. (Because of the reimbursement ceiling imposed by the prevailing charge limits, the use of Medicare reasonables places an upper bound on physician cost variation.) In parentheses next to each DRG payment is its coefficient of variation (CV), which provides a standardized measure for comparing variation across groups with different means. Lower CVs indicate less cost variability within DRG and hence imply greater homogeneity in resource use. (A comparable table for Part A hospital costs can be found in the Appendix: Table A-1.)

Mean payments vary across physician DRGs much as we might expect, with surgical admissions far more expensive than medical ones. Physician bills for major joint procedures (DRG 209) are $2200-$2800, or 5-10 times what it costs to treat angina pectoris (DRG 140). More seriously ill patients are also more expensive to treat; pacemaker cases where the patient has an acute myocardial infarction or congestive heart failure (DRG 115) cost $200-400 more to treat than pacemaker cases with other diagnoses (DRG 116). Otherwise similar patients who are 70 years and over or who have complicating conditions should also be more physician-intensive, and hence be more expensive. For surgical DRGs, this appears to be the case, but for the atherosclerosis DRGs (132 and 133), the opposite is true and for many medical DRGs the differences are small or non-existent.

2.2 Variation Within Physician DRGs

More important than the average payment level is the variation around that mean, for this indicates the likelihood that the DRG payment will in fact reflect the costs incurred by the physician. What is immediately striking from Table 2-1 is the difference in magnitude of CVs between medical and surgical physician DRGs. Surgical DRGs are quite homogeneous with CVs of 0.40 or lower. Some show remarkably little variation in physician inputs, such as lens procedures (DRG 39) with CVs ranging from only 0.18 to 0.34, respectively in the four states.

TABLE 2-1

MEAN DRG PAYMENTS FOR PHYSICIANS (CVs in parentheses)

DRG		Michigan	New Jersey	North Carolina	Washington
14	Specific Cerebrovasc Dis exc TIA	$ 674 (0.90)	$ 763 (0.74)	$ 414 (0.86)	$ 555 (0.87)
15	Transient Ischemic Attacks	589 (0.93)	575 (0.69)	343 (1.10)	364 (0.78)
16	Nonspecific Cerebrovasc Dis w/ CC	680 (0.92)	737 (0.70)	--	587 (1.21)
17	Nonspecific Cerebrovasc Dis w/o CC	590 (0.93)	592 (0.76)	370 (1.03)	366 (0.68)
39	Lens Procedures	1826 (0.34)	1842 (0.26)	1293 (0.21)	1584 (0.18)
89	Pneumonia Age 70+ &/or CC	470 (1.00)	604 (0.88)	320 (0.92)	387 (1.07)
90	Pneumonia Age 18-69 w/o CC	469 (1.18)	562 (1.01)	310 (0.99)	316 (1.04)
115	Perm Pacemaker Implant w/AMI or CHF	2212 (0.32)	2594 (0.29)	1715 (0.29)	1912 (0.54)
116	Perm Pacemaker Implant w/o AMI or CHF	1887 (0.36)	2259 (0.30)	1572 (0.30)	1493 (0.35)
127	Heart Failure & Shock	487 (0.95)	556 (0.83)	340 (0.90)	361 (0.93)
132	Atherosclerosis Age 70+ &/or CC	469 (0.90)	541 (0.78)	330 (1.00)	329 (0.89)
133	Atherosclerosis Age < 70 w/o CC	472 (0.83)	587 (1.39)	314 (1.09)	329 (0.96)
140	Angina Pectoris	410 (0.88)	466 (1.00)	276 (1.11)	286 (0.94)
148	Major Bowel Procs Age 70+ &/or CC	1883 (0.44)	2555 (0.40)	1673 (0.41)	2020 (0.42)
149	Major Bowel Procs Age < 70 w/o CC	1850 (0.55)	2438 (0.36)	1591 (0.34)	1931 (0.36)
182	Gastroenteritis & Misc. Dis Age 70 &/or CC	479 (0.97)	588 (0.81)	330 (0.94)	331 (0.96)
183	Gastroenteritis & Misc. Dis Age 18-69 w/o CC	498 (0.94)	573 (0.82)	332 (0.92)	311 (0.87)
195	Cholecystectomy w/CDE Age 70+ &/or CC	1604 (0.37)	2200 (0.31)	1493 (0.30)	1764 (0.26)
196	Cholecystectomy w/CDE Age < 70 w/o CC	1468 (0.34)	1980 (0.30)	1430 (0.28)	1644 (0.15)
197	Cholecystectomy w/o CDE Age 70+ &/or CC	1281 (0.46)	1855 (0.38)	1246 (0.30)	1438 (0.36)
198	Cholecystectomy w/o CDE Age < 70 w/o CC	1195 (0.37)	1631 (0.32)	1182 (0.26)	1345 (0.26)
209	Major Joint Procedures	2206 (0.31)	2842 (0.33)	2576 (0.23)	2815 (0.19)
294	Diabetes Age 36+	466 (0.98)	533 (0.88)	302 (0.93)	376 (0.87)
336	Transurethral Prostatectomy Age 70+ &/or CC	1307 (0.33)	1679 (0.30)	1219 (0.23)	1349 (0.21)
337	Transurethral Prostatectomy Age < 70 w/o CC	1242 (0.32)	1545 (0.22)	1174 (0.21)	1298 (0.18)

Source: Medicare Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

By contrast, medical DRGs vary dramatically, with CVs ranging from 0.70 to well over 1.0. Consider heart failure and shock (DRG 127) in New Jersey, for example. Although the average MDDRG payment is quite low ($556 per admission), the range in costs are staggering, from $30 to $10,000. This degree of variation suggests that physicians would end up being either significantly under- or over-paid in nearly every case.

Why do we observe so much more variation in these medical physician DRGs? One reason may be the multiplicity of specialties involved. Surgical DRGs are usually managed by physicians in the same specialty, or at most two specialties. By contrast, attending physicians for medical DRGs come from a wide range of specialties. In New Jersey, for example, pneumonia is handled by internists in 58 percent of the cases and by general practitioners in another 13 percent. The remaining are treated by a diverse group, including cardiologists, general surgeons, family practitioners, and pulmonary disease specialists. A second reason for differences between medical and surgical DRGs may lie in the extent to which certain physician inputs are fixed or non-discretionary. Surgical DRGs always include both a surgeon and anesthesiologist; together these two account for two-thirds or more of the total DRG costs. The only fixed input for medical DRGs, on the other hand, is the attending physician (whose bill is included under routine hospital visits). Even this input will vary tremendously, however, as a function of length of stay.

2.3 Physician vs. Hospital DRG Cost Weights

If physician and hospital services are complementary inputs in the production of an inpatient stay, then we would expect physician DRGs to exhibit the same relationship with each other that hospital DRGs do. Table 2-2 presents cost weights for both hospital and physician DRGs. Each set of weights has been standardized by the average cost per case, hospital and physician respectively, for each state. Medicare PPS costs weights are also included for reference.

As a rule, more expensive hospital DRGs are also more expensive physician DRGs. Patients with pacemaker implants (DRGs 115 and 116), for example, cost two to three times more than average for both hospitals and physicians to treat. There are a couple of notable exceptions, however. Two simple

TABLE 2-2

COMPARISON OF PPS, HOSPITAL, AND PHYSICIAN DRG COST WEIGHTS

DRG		National PPS	Michigan		New Jersey		North Carolina		Washington	
			Hospital	Physician	Hospital	Physician	Hospital	Physician	Hospital	Physician
14	Specific Cerebrovasc Dis exc TIA	1.353	1.250	0.820	1.262	0.759	1.077	0.664	1.23	0.673
15	Transient Ischemic Attacks	0.667	0.665	0.717	0.641	0.572	0.585	0.550	0.453	0.441
16	Nonspecific Cerebrovasc Dis w/ CC	0.859	1.022	0.828	1.022	0.734	--	--	1.147	0.712
17	Nonspecific Cerebrovasc Dis w/o CC	0.839	0.761	0.719	0.703	0.589	0.777	0.594	0.571	0.444
39	Lens Procedures	0.501	0.469	2.224	0.400	1.833	0.467	2.074	0.438	1.920
89	Pneumonia Age 70+ &/or CC	1.103	1.061	0.572	1.086	0.601	0.986	0.514	0.991	0.469
90	Pneumonia Age 18-69 w/o CC	0.985	0.952	0.571	0.877	0.559	0.931	0.498	0.791	0.383
115	Perm Pacemaker Implant w/AMI or CHF	3.915	3.254	2.693	3.074	2.582	3.499	2.752	3.459	2.318
116	Perm Pacemaker Implant w/o AMI or CHF	2.867	2.312	2.298	2.362	2.248	2.845	2.522	2.382	1.810
127	Heart Failure & Shock	1.041	0.939	0.593	0.923	0.554	0.960	0.545	0.794	0.438
132	Atherosclerosis Age 70+ &/or CC	0.918	0.784	0.572	0.843	0.539	0.858	0.530	0.677	0.399
133	Atherosclerosis Age < 70 w/o CC	0.860	0.697	0.575	0.851	0.584	0.800	0.505	0.595	0.399
140	Angina Pectoris	0.755	0.665	0.499	0.683	0.464	0.698	0.443	0.556	0.347
148	Major Bowel Procs Age 70+ &/or CC	2.549	2.259	2.293	2.330	2.542	2.304	2.685	2.418	2.449
149	Major Bowel Procs Age < 70 w/o CC	2.215	2.122	2.253	1.917	2.426	1.987	2.552	1.939	2.341
182	Gastroenteritis & Misc. Dis Age 70 &/or CC	0.619	0.624	0.583	0.653	0.585	0.582	0.530	0.522	0.401
183	Gastroenteritis & Misc. Dis Age 18-69 w/o CC	0.565	0.579	0.606	0.574	0.570	0.535	0.532	0.425	0.376
195	Cholecystectomy w/CDE Age 70+ &/or CC	2.169	1.607	1.953	1.789	2.189	1.902	2.396	2.014	2.139
196	Cholecystectomy w/CDE Age <70 w/o CC	2.059	1.310	1.787	1.478	1.970	1.427	2.295	1.185	1.993
197	Cholecystectomy w/o CDE Age 70+ &/or CC	1.487	1.233	1.560	1.361	1.846	1.384	2.000	1.414	1.743
198	Cholecystectomy w/o CDE Age < 70 w/o CC	1.275	0.957	1.455	0.992	1.623	1.122	1.896	0.930	1.631
209	Major Joint Procedures	2.291	1.916	2.686	1.980	2.828	2.464	4.133	2.185	3.412
294	Diabetes Age 36+	0.809	0.768	0.567	0.788	0.530	0.720	0.485	0.700	0.456
336	Transurethral Prostatectomy Age 70+ &/or CC	1.008	0.898	1.591	0.910	1.671	0.919	1.955	0.737	1.635
337	Transurethral Prostatectomy Age < 70 w/o CC	0.849	0.752	1.512	0.733	1.538	0.801	1.883	0.591	1.574

Source: PPS cost weights are taken from the Federal Register 9/1/83. The remaining cost weights were calculated from 1982 Medicare Part A and Part B claims from the four states.

surgical DRGs, lens procedures and TURPs, are very inexpensive from the hospital's perspective (with weights well below 1.0), but their physician costs run well above average (1.8-2.2). Nevertheless, the simple correlation of hospital and physician cost weights across all DRGs is positive and significant, ranging from 0.71 to 0.84.

Physician DRG cost weights are remarkably consistent across states, suggesting that national data might not be necessary to actually calculate cost weights prior to program implementation. The simple correlation between pairs of states are in the 0.95-0.96 range, with a correlation of 0.98 between each individual state's relative value scale and a weighted four-state average.

2.4 Explanatory Power of DRGs

Earlier we saw that some physician DRGs appeared quite homogeneous in their resource use while others displayed considerable cost variation. But we only looked at a relatively small number of DRGs (although they account for a disproportionate share of Medicare admissions). How well do DRGs as a group explain variation in physician costs? In order to have a reference point for comparison, we also tested the ability of the DRG classification system to predict hospital costs. Since the system was developed based on hospital cost data, it would not be fair to expect DRGs to do a better job of explaining cost variation for physicians than for hospitals.

Table 2-3 summarizes the variation (as measured by the R^2) in hospital and physician costs explained by DRGs, based on analysis of variance. The findings are astonishing: DRGs are far superior in explaining physician cost variation with an R^2 of 0.47 to 0.73 vs. only 0.16 to 0.30 for hospitals. Excluding outlier cases* definitely boosts the R^2s but does not narrow the differential in explained variance between the two sets of costs. Based on trimmed data, DRGs explain 63-84 percent of the variation in physician costs but only 30-48 percent for hospital costs.

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*Outliers were defined using the same approach adopted by Pettengill and Vertrees (1982) in developing the PPS cost weights. This meant dropping cases whose costs exceeded three standard deviations times the geometric mean for each DRG. Use of this criterion eliminated about 2 percent of cases in each state.

TABLE 2-3

VARIATION (R^2) IN PHYSICIAN AND HOSPITAL COSTS EXPLAINED BY DRGs

	Physician	Hospital
Michigan		
Untrimmed	0.47	0.17
Trimmed[a]	0.63	0.30
New Jersey		
Untrimmed	0.57	0.18
Trimmed[a]	0.70	0.32
North Carolina		
Untrimmed	0.57	0.16
Trimmed[a]	0.75	0.32
Washington		
Untrimmed	0.73	0.30
Trimmed[a]	0.84	0.48

[a] Trimmed data exclude outliers, defined as cases exceeding three standard deviations from the geometric mean.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

In order to better understand the relative performance of hospital and physician DRGs, we decomposed the sample and conducted analyses of variance for medical and surgical DRGs separately, as shown on Table 2-4. Here, we can see that virtually all of the explained variation in total physician and in hospital costs was due to surgical DRGs. The surgical DRGs account for one-third of the variation in (untrimmed) hospital costs for surgical admissions, and one-half to two-thirds of the variation in physician costs. By contrast, medical DRGs are unable to explain more than a small percent of costs for medical admissions. Even after eliminating outlier cases, about 90 percent of the cost variation for non-surgical cases remains unexplained.

Why is the explanatory power of DRGs so much greater in Washington than in the other 3 states? The most likely reason is the greater homogeneity of physician treatment patterns (as will be illustrated in section 3). Washington physicians keep their patients in the hospital a much shorter period of time, providing less opportunity to order x-rays, consultations, and other physician services. The result is much less cost variation within DRG in Washington.

3.0 PHYSICIAN DRGs DECOMPOSED

In this section, we examine the kinds of physician services that go into a DRG. How many services and how many physicians are involved? How do physicians in different states treat the same DRG? What impact does the specialty of the attending physician have on total DRG costs?

3.1 Geographic Variation in Treatment

Table 3-1 decomposes lens procedure costs and inputs for physician DRGs. The numbers in parentheses represent the relative frequency with which a physician component is included; a surgeon and anesthesiologist are necessary inputs for the performance of lens operations, but the use of assistant surgeons, consultants, and the like is discretionary. The total MD-DRG price is a weighted average of all physician costs for the inpatient stay.

The lens procedure DRG is a particularly interesting one because it is even more homogeneous than most surgical DRGs. Lens procedures are performed by physicians in a single specialty (ophthalmology), they are always elective, and they are generally one of two operations: cataract extraction, or

TABLE 2-4

EXPLAINED VARIATION DECOMPOSED: MEDICAL AND SURGICAL DRGs

	Surgical DRGs		Medical DRGs	
	Physician	Hospital	Physician	Hospital
Michigan				
Untrimmed	0.46	0.34	0.07	0.06
Trimmed[a]	0.58	0.49	0.12	0.10
New Jersey				
Untrimmed	0.53	0.31	0.05	0.06
Trimmed[a]	0.62	0.48	0.07	0.11
North Carolina				
Untrimmed	0.64	0.33	0.03	0.04
Trimmed[a]	0.71	0.51	0.06	0.09
Washington				
Untrimmed	0.70	0.39	0.10	0.09
Trimmed[a]	0.79	0.57	0.18	0.16

[a] Trimmed data exclude outliers, defined as cases exceeding three standard deviations from the geometric mean.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE 3-1

GEOGRAPHIC VARIATION IN TREATMENT OF LENS PROCEDURES (DRG #39)[a]

	Michigan	New Jersey	North Carolina	Washington
Surgeon	$1,480 (1.00)	$1,283 (1.00)	$1,129 (1.00)	$1,287 (1.00)
Anesthesiologist	176 (1.00)	233 (1.00)	121 (1.00)	159 (1.00)
Assistant Surgeon	333 (0.28)	260 (0.76)	222 (0.02)	254 (0.36)
Other Surgery[c]	197 (0.04)	560 (0.04)	400 (0.04)	285 (0.02)
Routine Hospital Visits	94 (0.13)	94 (0.60)	80 (0.05)	68 (0.07)
ICU Visits	128 (b)	86 (0.01)	123 (b)	128 (b)
Consultations	82 (0.20)	76 (0.43)	45 (0.11)	58 (0.04)
X-Rays	26 (0.54)	15 (0.89)	18 (0.75)	32 (0.88)
Other Tests	15 (0.68)	19 (0.87)	9 (0.71)	18 (0.44)
Total MDDRG Cost	$1,826	$1,842	$1,293	$1,584
Length of Stay (days)	3.9	4.1	3.7	3.0

[a] All dollars are Medicare reasonable charges. Relative frequency of each physician service is in parentheses.

[b] Frequency less than one percent.

[c] Includes charges by surgeons, assistant surgeons, and anesthesiologists.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

extraction plus intraocular lens implant. Given these factors, we might expect to observe few geographic differences in practice patterns. In fact, however, care of lens procedure patients is far more service-intensive in New Jersey than in the other three states. New Jersey ophthalmologists use an assistant surgeon in three out of every four operations, while Michigan and Washington surgeons do so only a third as often (28 and 36 percent of the time, respectively). North Carolina ophthalmologists, on the other hand, almost never use an assistant. Patients in New Jersey are also far more likely to have non-surgeons involved in their care, either as attendings providing routine visits (60% of cases versus only 5-13% in the other three states) or as consultants (43% versus 4-20%).

Table 3-2 is a similar example of geographic variation in the treatment of heart failure. Differences in attending physician routine hospital visit costs (the only fixed input) are due to differences in hospital lengths of stay and specialty mix. Again, we observe a similar pattern with New Jersey showing the highest use of all discretionary services and North Carolina and Washington the lowest, with Michigan somewhere in between. New Jersey attendings order consults at twice the rate of their North Carolina and Washington colleagues, for example.

These patterns can be repeated for each of the 467 DRGs. New Jersey physicians keep their patients in the hospital far longer than physicians in the other three states. Longer stays mean greater opportunities to generate physician inpatient charges; more visits, more tests, more consultations. Table A-2 in the Appendix compares consultation rates for our entire subgroup of high volume DRGs. Similar examples can be found for assistant surgeon rates (Table A-3) and for hospital visit rates (Table A-4).

3.2 Specialty Differences in DRG Treatment

At least some of the large within-DRG variation observed for medical admissions may be explained by the specialty of the attending physician. Not only do specialists charge higher fees than general practitioners, but they may also use more (or more expensive) inputs in the treatment of similar cases. Table 3-3 compares the treatment of angina pectoris by general and family practitioners (GPs/FPs), internists, and cardiologists. The mix of specialties is clearly different across the two states. One out of every five hospitalized angina patients in New Jersey is treated by a cardiologist, compared with about one out of every ten in Michigan, one out of seven in

TABLE 3-2

GEOGRAPHIC VARIATION IN TREATMENT OF HEART FAILURE AND SHOCK (DRG #127)[a]

	Michigan	New Jersey	North Carolina	Washington
Routine Hospital Visits-Attending MD	$240 (1.00)	$257 (1.00)	$191 (1.00)	$177 (1.00)
Routine Hospital Visits-Other MDs	125 (0.13)	104 (0.25)	88 (0.16)	101 (0.29)
ICU Visits	184 (0.14)	164 (0.25)	121 (0.21)	116 (0.10)
Consultations	110 (0.36)	108 (0.40)	64 (0.19)	80 (0.22)
Diagnostic Surgery[b]	271 (0.12)	269 (0.11)	209 (0.10)	141 (0.08)
X-Rays	90 (0.99)	65 (0.98)	54 (0.97)	69 (0.99)
Other Tests	54 (0.85)	101 (0.95)	31 (0.80)	66 (0.71)
Total MDDRG Cost	$488	$556	$340	$361
Length of Stay (days)	11.6	13.3	11.0	7.8

[a] All dollars are Medicare reasonable charges. Relative frequency of each physician service is in parentheses.

[b] Includes charges by surgeons, assistant surgeons, and anesthesiologists.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE 3-3

DIFFERENCES IN TREATMENT OF ANGINA PECTORIS (DRG #140): ACROSS SPECIALTY AND ACROSS STATES[a]

	Michigan			New Jersey			North Carolina			Washington		
	GP/FP (25%)	IM (53%)	CARD (9%)	GP/FP (15%)	IM (58%)	CARD (20%)	GP/FP (33%)	IM (61%)	CARD (4%)	GP/FP (29%)	IM (47%)	CARD (14%)
Routine Hospital Visits-Attending MD	$ 152 (1.00)	$ 190 (1.00)	$ 181 (1.00)	$ 171 (1.00)	$ 195 (1.00)	$ 191 (1.00)	$ 118 (1.00)	$ 158 (1.00)	$ 174 (1.00)	$ 112 (1.00)	$ 136 (1.00)	$ 135 (1.00)
Routine Hospital Visits-Other MDs	98 (0.10)	85 (0.10)	92 (0.11)	75 (0.32)	80 (0.16)	85 (0.14)	64 (0.09)	71 (0.17)	62 (0.21)	61 (0.23)	66 (0.24)	93 (0.36)
ICU Visits	131 (0.21)	157 (0.27)	151 (0.30)	130 (0.28)	143 (0.41)	137 (0.49)	62 (0.30)	79 (0.35)	127 (0.34)	99 (0.10)	100 (0.13)	96 (0.17)
Consultations	91 (0.34)	99 (0.30)	104 (0.23)	97 (0.57)	97 (0.30)	93 (0.25)	56 (0.12)	60 (0.11)	65 (0.18)	70 (0.18)	69 (0.14)	86 (0.28)
Diagnostic Surgery[b]	251 (0.04)	326 (0.07)	344 (0.07)	306 (0.06)	224 (0.05)	310 (0.05)	165 (0.03)	191 (0.05)	526 (0.10)	223 (0.03)	345 (0.04)	429 (0.07)
X-Rays	65 (0.90)	89 (0.90)	83 (0.90)	54 (0.95)	54 (0.96)	56 (0.96)	34 (0.92)	42 (0.92)	55 (0.94)	56 (0.99)	56 (0.99)	63 (0.98)
Other Tests	62 (0.83)	70 (0.93)	67 (0.91)	79 (0.95)	92 (0.95)	93 (0.96)	31 (0.76)	42 (0.93)	58 (0.97)	34 (0.76)	47 (0.80)	80 (0.89)
Total MDDRG Cost	$ 342	$ 439	$ 421	$ 432	$ 446	$ 454	$ 209	$ 292	$ 407	$ 235	$ 282	$ 376
Length of Stay	7.6	8.9	8.4	9.7	9.9	9.6	7.5	7.7	8.3	4.4	5.0	5.4

[a] All dollars are Medicare reasonable charges. Relative frequency of each physician service is in parentheses. GP/FP = general/family practitioner, IM = internist, CARD = Cardiologist.

[b] Includes charges by surgeons, assistant surgeons, and anesthesiologists, all procedures.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

Washington, and fewer than one of twenty in North Carolina. Care in the other states, especially in North Carolina, is much more likely to be provided by a general or family practitioner. These differences simply reflect the underlying distribution of physicians in each state.

Within New Jersey, there is surprisingly little difference in the total costs of treating angina, only about $20 more when the attending physician is a specialist. Higher fees charged by internists and cardiologists appear to be largely offset by the greater propensity of GPs/FPs to order consultants and to include other physicians in routine patient care. By contrast, there are marked specialty differences across North Carolina and Washington physicians, with internists costing 20-40 percent more than GPs and FPs to treat angina, and cardiologists almost double. These higher specialist costs are partly due to higher fees and longer stays, but even more important is the greater frequency of discretionary services. Again, Michigan physicians occupy an intermediate position, with specialists more expensive than GPs/FPs in their treatment of angina but no difference between internists and cardiologists.

Table 3-4 presents a similar comparison for DRG 89: pneumonia with patient age 70+ and/or with complicating conditions. Treatment is both more service-intensive and more expensive when provided by an internist than by a general or family practitioner. Again, the specialty differences are much less pronounced in New Jersey, although this may be due to triaging of more seriously ill pneumonia patients to pulmonary disease specialists. These specialists treat 4 percent of New Jersey pneumonia admissions at an average cost of $846. (Admissions by pulmonary disease specialists account for 2% or less of all pneumonia cases in the other three states.)

3.3 Can Specialty Mix Explain Within-DRG Variation?

Although the preceding tables illustrate some specialty differences in the treatment of angina and pneumonia, they are not always as marked as we might have expected. How much of the tremendous variation in medical DRGs can we explain based on the specialty of the attending physician? Table 3-5 summarizes the percent of variation explained (R-squares) for each of our medical DRG groups. Because certain specialties may be disproportionately represented in one of several related DRGs (e.g., specific cerebrovascular

TABLE 3-4

DIFFERENCES IN TREATMENT OF PNEUMONIA (DRG #89): ACROSS SPECIALTY AND ACROSS STATES[a]

	Michigan		New Jersey		North Carolina		Washington	
	GP/FP (39%)	IM (45%)	GP/FP (23%)	IM (58%)	GP/FP (47%)	IM (48%)	GP/FP (43%)	IM (41%)
Routine Hospital Visits-Attending MD	$ 221 (1.00)	$ 273 (1.00)	$ 250 (1.00)	$ 302 (1.00)	$ 177 (1.00)	$ 234 (1.00)	$ 164 (1.00)	$ 216 (1.00)
Routine Hospital Visits-Other MDs	126 (0.10)	128 (0.13)	96 (0.33)	115 (0.26)	76 (0.10)	97 (0.17)	91 (0.26)	107 (0.34)
ICU Visits	185 (0.04)	229 (0.08)	161 (0.08)	190 (0.11)	125 (0.05)	131 (0.10)	141 (0.03)	123 (0.07)
Consultations	103 (0.27)	115 (0.36)	113 (0.51)	117 (0.41)	55 (0.13)	64 (0.17)	80 (0.17)	82 (0.20)
Diagnostic Surgery[b]	243 (0.10)	293 (0.17)	311 (0.14)	315 (0.20)	153 (0.07)	165 (0.13)	201 (0.08)	229 (0.14)
X-Rays	75 (0.98)	97 (0.99)	63 (0.92)	69 (0.99)	44 (0.98)	55 (0.98)	65 (0.99)	80 (0.99)
Other Tests	27 (0.61)	38 (0.77)	58 (0.92)	84 (0.91)	14 (0.58)	18 (0.75)	32 (0.47)	46 (0.52)
Total MDDRG Cost	$ 385	$ 527	$ 512	$ 609	$ 260	$ 364	$ 305	$ 422
Length of Stay	11.5	13.2	13.8	14.6	12.2	12.2	7.9	9.3

[a] All dollars are Medicare reasonable charges. Relative frequency of each physician service is in parentheses.

[b] Includes charges by surgeons, assistant surgeons, and anesthesiologists, all procedures.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE 3-5

PERCENT OF WITHIN-DRG PHYSICIAN COST VARIATION EXPLAINED BY SPECIALTY OF ATTENDING PHYSICIAN[a]

DRG		Michigan	New Jersey	North Carolina	Washington
14-17	Cerebrovascular Disorders	3.8%	1.0%	7.3%	6.8%
89-90	Pneumonia	2.6	1.7	3.8	6.7
127	Heart Failure and Shock	1.8	1.4	3.9	3.1
132-133	Atherosclerosis	1.5	0.6	4.6	3.6
140	Angina Pectoris	1.4	0.7	3.6	2.9
182-183	Gastroenteritis and Misc. Digestive Dis	1.8	1.6	4.7	3.2
294	Diabetes	1.8	1.1	4.0	4.0

[a] Dummy variables were used to hold specific DRGs constant for those conditions encompassing two or more DRGs.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

disease vs. transient ischemic attack), we held the specific DRG constant in our regression analysis.

The specialty of the attending physician explains surprisingly little of the variation in treatment costs, virtually none (less than 2%) in New Jersey, 1-4 percent in Michigan, 3-7 percent in Washington, and 4-9 percent in North Carolina. This implies that DRG reimbursement by specialty might not be much more equitable on average than a single all-specialty payment.

4.0 DISTRIBUTIONAL EFFECTS OF MD-DRGs ON ATTENDING PHYSICIANS

4.1 The Averaging Principle

Any case payment approach like physician DRGs involves some sort of averaging. It is assumed that some admissions will require more physician services and some admissions will require less, but that on average the DRG payment is a reasonable reimbursement for services provided. How true this is for individual physicians depends in part on caseload size. In general, the more cases, the less likelihood there is of random bias.

The average physician in our four states admits 2-2 1/2 Medicare patients per DRG, treating 15-18 different DRGs in the course of a year. Of all specialties, only ophthalmologists appear to have a concentrated practice, admitting a dozen Medicare patients annually in the same DRG. This implies very little physician averaging at the DRG level -- any cancelling out will have to occur across DRGs.

To examine whether this happens, we calculated per case gains and losses across all of the physician's admissions, highlighting which DRGs contribute most to the result. Although some cancelling out does take place, it is fairly limited. GPs would enjoy net gains on virtually every DRG they admitted while internists and other medical specialties can be expected to lose on almost every DRG. The apparent reason is that all of these specialty groups admit patients into the same DRGs, and general practitioners are simply less expensive.

From the individual physician's perspective, gains and losses on any one DRG may be less important than gains and losses for his/her practice as a whole. In the sections that follow, we examine winners and losers in detail based on the physician's total caseload.

4.2 Who Wins, Who Loses, and By How Much?

Under DRG-based case reimbursement, even with an urban-rural differential, the average physician would lose money, $13 per case in New Jersey, $19 in Michigan and North Carolina, and $20 in Washington. While the variation is tremendous, ranging from gains of $3,700 per admission to losses of over $6,000, most physicians would experience more modest revenue changes. About one-half of attending physicians in Michigan and New Jersey, and two-thirds of those in North Carolina and Washington would receive $150 more or less than their average cost (see Table 4-1). These gains (losses) would appear quite small relative to the average DRG payments of $1,000-$1,500 depending on state.

Does this mean that only relatively small changes in case management would be necessary for physicians to break even on average? The answer is no, for two reasons. First, in the case of surgical DRGs, a loss even of $150 is fairly small compared to the total MD-DRG costs (less than 10%). A similar dollar loss on medical admissions, on the other hand, would constitute 30-50 percent of the total cost of care and an offset presumably would require major changes in treatment patterns. Second, a small but substantial proportion of physicians (18-26%) would be "big" losers, incurring losses greater than $150 on every patient they admit.

Losers, of course, are only half the story. For policy purposes, we are also interested in winners, physicians spending far less on treatment than the DRG reimbursement they would receive. In fact, there are roughly the same proportion of big winners as big losers in each state. If these gains are due to better case management, then the windfall is a short-run (assuming recalibration) reward for efficiency. If, on the other hand, their cases are less seriously ill, then the windfalls could introduce substantial inequities, particularly if within-DRG severity varied systematically by specialty.

4.3 Differential Impact by Specialty

Average per case losses of $13-$19 in our four states hide the fact that some specialties may incur far greater losses and that other specialties may actually make money. Since these differential impacts may greatly influence access by Medicare beneficiaries to specialized services, they are probably more important than distributional effects more generally. There are definite redistributive effects by specialty from a fixed, urban-rural DRG payment (Table 4-2). GPs and FPs experience substantial windfall gains ($11 to $74

TABLE 4-1

DISTRIBUTION OF PER CASE WINNERS AND LOSERS[a]

	Michigan	New Jersey	North Carolina	Washington
Big Winners ($150+)	30.2%	26.2%	15.8%	18.3%
Small Winners ($50-150)	16.1	18.0	25.7	25.9
Break Even (+ $50)	15.6	18.6	26.0	22.2
Small Losers ($-50-150)	11.9	13.4	14.6	12.5
Big Losers ($-150+)	26.2	23.9	17.7	21.1

[a] Columns may not sum to 100 percent due to rounding.

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE 4-2

COMPARISON OF WINNERS AND LOSERS BY SPECIALTY ($ Per Case)

	Michigan	New Jersey	North Carolina	Washington
Family Practice	$ 53	$ 59	$ 46	$ 45
General Practice	28	74	66	47
Cardiology	(89)	(69)	(230)	(230)
Gastroenterology	(159)	(132)	(243)	(34)
Internal Medicine	(38)	(16)	(63)	(62)
Pulmonary Disease	(155)	(154)	(251)	(187)
General Surgery	(17)	(43)	(8)	(26)
Neurosurgery	(115)	(133)	(44)	(160)
Obstetrics-Gynecology	3	24	15	6
Ophthalmology	26	47	30	(2)
Orthopedic Surgery	26	(18)	(6)	(29)
Otolaryngology	63	(14)	10	26
Plastic Surgery	(85)	(170)	(163)	(125)
Thoracic Surgery	(13)	(197)	(168)	56
Urology	(19)	(5)	4	(13)
Neurology	(9)	(101)	(158)	(60)
Psychiatry	(232)	78	(85)	(71)
All Physicians	(19)	(13)	(19)	(24)

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

per case), largely because of their lower fees. OB-GYNs, ophthalmologists, otolaryngologists, and orthopedic surgeons also generally make money on each admission, although the absolute dollars tend to be smaller. Who are the big losers? They include the medical subspecialists (cardiologists, gastroenterologists, and pulmonary disease specialists), some of the higher priced surgical specialists (neuro, plastic, and thoracic surgeons), and neurologists.

Gains and losses for most specialty groups are significantly different from those incurred by GPs and FPs (based on regression analysis). Exceptions include ophthalmologists and other surgical specialists (varying by state) whose net wins per case are no different from those of their GP colleagues. Surprisingly, specialty explains very little of the variation in physician gains and losses, only 5.7 percent in North Carolina and less than 4 percent in the remaining states. There is clearly far more variation in winners and losers within specialty than between specialties.

How can we explain these specialty differences? Why does the ophthalmologist and the GP win on average and the general surgeon and the internist lose? The main reason probably lies in the degree of within-DRG competition among specialties. GPs, FPs, internists, and medical subspecialists all admit patients in the same DRGs, and the GPs/FPs are simply less expensive. By contrast, ophthalmologists "control" the DRGs they deal with; there is virtually no between-specialty competition in the treatment of eye disorders. Whether an ophthalmologist wins or loses is thus primarily a function of how he/she treats patients relative to other ophthalmologists. Similarly, OB-GYNs, otolaryngologists, urologists, and (to a lesser extent) orthopedic surgeons are the chief specialties involved in their respective diagnostic categories, especially for the surgical DRGs. (Medical specialists may admit and care of patients with kidney and urinary tract diseases, for example, but only the urologists operate on them.)

Specialization alone is not sufficient to ensure that surgeons always win; they must also control their area of specialization. Take thoracic surgeons, for example, who except in Washington, would lose $100-200 on every case. If they limited themselves to the major heart and lung operations for which they are uniquely trained, their net losses might be smaller or even become gains. Instead, thoracic surgeons perform a fair amount of other, often less complex surgery (e.g., pacemaker implants), for which there is fair amount of competition, especially from general surgeons. Specialization with concentration is necessary to minimize the negative effects of low-cost competition.

Of course, mean gains and losses for a specialty do not mean that all physicians in that group win or lose. There are winners and losers within every specialty (not shown). In fact many specialties who incur net losses, such as neurosurgeons, orthopedic and plastic surgeons, have almost as many winners as losers.

4.4 What Do Losses Really Mean?

The per case losses shown in Table 4-2 above are substantial for some specialties, especially for medical specialists and some surgeons. These losses, however, are based on the difference between the mean DRG payment and all current physician charges including those of the attending physician. They thus incorporate, among other things, the very high fees that these specialists may be charging. An alternative is to calculate the residual payment that the attending physician would receive after reimbursing all other physicians involved in the care of their patients.

Table 4-3 compares these two alternative approaches to calculating gains and losses. The first column represents inclusive gains and losses by specialty and is identical to the first column in Table 4-2. The second column indicates the residual payment for each specialty. These payments are all clearly positive. Consider cardiologists, for example. Cardiologists would experience an inclusive loss of $89 per admission, meaning that they would have to forego $89 of their fees in order to break even. Their residual payment, however, would average $461, somewhat less than what they would have received in the absence of DRGs, but still substantially more than what their colleagues in general internal medicine would receive.

5.0 DISTRIBUTIONAL EFFECTS ON MEDICAL STAFFS

5.1 Pooling Risk at the Hospital Level

The average physician sees 35-40 Medicare cases per year in the hospital setting. Even Medicare dependent specialties, like cardiology, internal medicine, and urology, only admit 50-60 patients annually. These small inpatient caseloads may produce large losses simply due to random fluctuations

TABLE 4-3

INCLUSIVE VERSUS RESIDUAL GAINS AND LOSSES FOR MICHIGAN ATTENDING PHYSICIANS ($ PER CASE)

	Inclusive	Residual
Family Practice	$ 53	$ 267
General Practice	28	243
Cardiology	(89)	461
Gastroenterology	(159)	219
Internal Medicine	(38)	252
Pulmonary Disease	(155)	183
General Surgery	(17)	512
Neurosurgery	(115)	713
OB-GYN	3	553
Ophthalmology	26	1,330
Orthopedic Surgery	26	746
Otolaryngology	63	621
Plastic Surgery	(85)	533
Thoracic Surgery	(131)	1,170
Urology	(19)	596
Neurology	(9)	239
Psychiatry	(232)	450
All Physicians	(19)	436

Note: Inclusive gain (loss) = DRG payment - Attending MD's current charges - Other MDs' current charges.

Residual gain (loss) = DRG payment - Other MDs' current charges.

Source: Medicare Part A and Part B claims from Michigan, 1982.

in casemix severity. One solution would be to pay the hospital medical staff rather than the individual attending physician. Because of their high volume of Medicare cases, there should be greater opportunity for risk pooling and for the averaging principle to work (just as it does for hospital PPS).

At the hospital level, casemix is a powerful predictor of physician costs per case, as seen in Table 5-1. (The Casemix Index is based on the Part B cost weights.) The lion's share of the variation in physician DRG costs across medical staffs can be explained by the kind of patients they treat. New Jersey is a notable exception, with only one-fourth of the variation in average staff costliness captured by casemix. This implies a relatively homogeneous physician casemix across New Jersey hospitals, a weak relationship between treatment costs and case complexity within hospital, or both. We rule out the casemix index per se as a factor, given its strong impact on medical staff costs in the other three states.

Given this strong relationship between the CMI and average staff costs, we would expect gains and losses to be relatively modest on average. Comparison of the four histograms in Figure 5-1 confirms that this is, in fact, the case. The majority of medical staffs would be within $100 of their average physicians costs. Surprisingly few medical staffs in North Carolina and Washington hospitals would lose more than $100 per case: only 5 percent. Although there would be considerably more losing staffs in Michigan (20%) and New Jersey (16%), we observe that this would be offset by a disproportionate number of medical staffs winning more than $100 per case in these states (34% and 22%, respectively). Big winners and big losers would be particularly pronounced in Michigan, with 25 percent of staffs receiving windfall gains in excess of $150 per case and 16 percent losing more than $150. (Of course, by losses we mean only that these medical staffs would receive less than they had under fee-for-service reimbursement.)

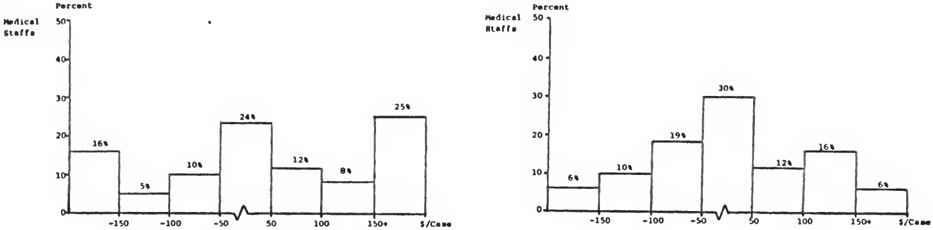
Those differences are partly attributable to the use of a constant dollar x-axis to show gains and losses across states with very different costs-of-living, but they are also due to the extent of across-hospital variation in DRG costs.

TABLE 5-1

VARIATION (R^2) IN PHYSICIAN COSTS PER ADMISSION EXPLAINED BY HOSPITAL CASEMIX INDEX

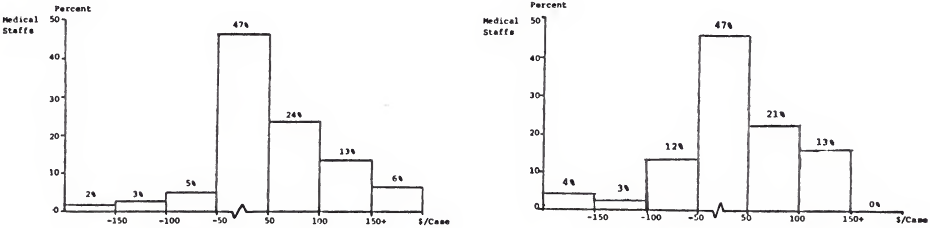
	Corrected R^2
Michigan	54.3
New Jersey	25.7
North Carolina	87.5
Washington	92.7

Source: Merged Part A-B files for the states of Michigan, New Jersey, North Carolina, and Washington, 1982.



MICHIGAN (N = 197)

NEW JERSEY (N = 98)



NORTH CAROLINA (N = 130)

WASHINGTON (N = 75)

FIGURE 5.1 FREQUENCY DISTRIBUTION OF GAINS (LOSSES) PER CASE

5.2 Differential Impact by Type of Hospital

Under PPS, teaching hospitals have been given a special adjustment to offset their indirect teaching costs. There would not appear to be any justification for a comparable MD-DRG adjustment, however, for two reasons. First, the MD-DRG cost weights effectively overpay physicians in teaching hospitals. This is because their DRG payments would be based on cost weights that incorporated physician services which in their institution would be provided by residents (whose costs are borne by Part A). Thus, medical staff in teaching hospitals would profit by having residents treat Medicare patients without having to pay for them. Second, the rationale for an indirect teaching adjustment for physicians, as is done now in hospital PPS, does not hold. Under PPS, teaching hospitals now receive a lump sum payment to cover the costs of tests and procedures performed solely for teaching purposes. The professional component of those tests (e.g. interpretation), however, is performed by residents whose salaries are paid through Part A. There would be no reason to also reimburse the medical staff an additional amount to cover this component.

How would medical staff in teaching hospitals fare under physician DRG reimbursement? The average teaching hospital staff in New Jersey would make money on each admission, and while those in North Carolina and Washington teaching institutions would lose money on each case, the actual dollars are fairly modest: $14 and $2 losses, respectively. (See Table 5-2.) Losses incurred by teaching hospital staffs in Michigan, on the other hand, would be relatively more substantial: $52 per case on average. Nevertheless, teaching medical staffs in all states are more likely to be losers, particularly in North Carolina and Michigan where 31 and 40 percent of teaching hospitals, respectively, would lose $100 or more per case.

We cannot tell from these simple descriptive tables whether medical staffs in teaching hospitals are more likely to lose because of their teaching function or because of other staff (specialty mix) or hospital (ownership, bedsize) characteristics associated with teaching status. Holding these other factors constant, we find that only those medical staffs in North Carolina and Michigan teaching hospitals would actually lose money. New Jersey and Washington teaching hospital staff would be significantly more likely to make money than their nonteaching colleagues.

TABLE 5-2

DISTRIBUTIVE IMPACT OF MD-DRGs ON MEDICAL STAFFS

	Per Case Gain (Loss)	Win $100+ per Admission	Break-Even (± $100)	Lose $100+ per Admission
Michigan (n=197)				
All	$ 20	34%	46%	20%
Teaching	(52)	21	39	40
Non-Teaching	49	39	49	12
New Jersey (n=98)				
All	$ 13	22%	62%	16%
Teaching	9	17	64	19
Non-Teaching	13	29	57	14
North Carolina (n=130)				
All	$ 37	19%	76%	5%
Teaching	(14)	25	44	31
Non-Teaching	43	19	80	1
Washington (n=75)				
All	$ 23	12%	83%	5%
Teaching	(2)	0	86	14
Non-Teaching	25	13	83	4

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

Specialty mix, however, is a powerful predictor in all states: the more specialized the medical staff, the greater the losses per admission. To the extent that more seriously ill patients are triaged to specialists and disproprotionately admitted to teaching hospitals, substantial inequities will remain. Further analysis is needed to determine whether specialized staffs are treating sicker patients within a given DRG.

5.3 Medicare Revenue Shares for Winning and Losing Medical Staffs

What is the most appropriate measure to apply to judge the effect of MD-DRGs on individual medical staffs? From the above discussion, we conclude that the average gain or loss per case while providing some information fails to capture the magnitude of the effect of MD-DRGs on the medical staff as a whole. Calculations of average gain or loss per case treat hospitals with substantial Medicare caseloads and those treating comparatively few Medicare patients with equal weight. To control for this, we have also analyzed the gains or losses per case as a percent of total payments by Medicare for physician services under the existing fee-for-service system.

To a large extent, the results mirror those presented for per case gains and losses. (See Table 5-3.) Only a small percent of medical staffs in North Carolina and Washington would incur losses in excess of 10 percent of their current Part B revenues (9% and 4%, respectively), with substantially more losers in Michigan (24%) and New Jersey (18%). Losing staffs account for a disproportionate share of admissions, however, especially in Michigan where they treat almost a third of all Medicare inpatients. Conversely, medical staffs experiencing gains in excess of 10 percent of revenues admit disproportionately fewer Medicare cases. Nevertheless, the majority of staffs in each state would experience either gains or very moderate losses, and these staffs are currently responsible for the majority of Medicare admissions.

6.0 IMPACT ON BENEFICIARY COST-SHARING

Policy discussions regarding DRG-based reimbursement have focused on redistributive effects across physicians and across hospitals. But what impact would physician DRGs have on Medicare beneficiaries? In addition to an annual deductible plus any additional amount if the physician does not accept

TABLE 5-3

DISTRIBUTION OF HOSPITALS AND ADMISSIONS BY PERCENT GAIN (LOSS) OF MEDICARE REVENUE[a]

	Michigan		New Jersey		North Carolina		Washington	
	Hospitals	Admissicns	Hospitals	Admissions	Hospitals	Admissions	Hospitals	Admissions
Losses more than 10% of Medicare Revenue	24.4%	30.3%	18.4%	14.3%	9.2%	20.0%	9.3%	10.7%
Gains (losses) ± 10 percent of Medicare Revenue	28.4	33.5	54.1	59.8	44.6	51.9	54.6	70.5
Gains more than 10% of Medicare Revenue	47.2	36.2	27.6	25.8	46.2	28.1	36.0	18.8

[a] Columns sum to 100 percent.

Source: Merged A-B Medicare claims file for Michigan, New Jersey, North Carolina, and Washington, 1982.

assignment, beneficiaries currently pay 20 percent of reasonable charges. Presumably, under physician DRGs, the copayment would simply be 20 percent of the DRG rate. Given the wide variation in physician DRG payments, especially for medical DRGs, however, some beneficiaries would end up paying far more than they had under fee-for-service, and others would pay far less.

The first column in Table 6-1 presents the distribution of hospitalized North Carolina Medicare beneficiaries by the magnitude of the change in cost sharing they would experience under physician DRGs. (For beneficiaries with multiple hospitalizations during the year, the changes have been summed together.) The vast majority of beneficiaries (82%) would have experiencd a change in their total cost sharing of $75 or less. Another ten percent of the beneficiary population would have experienced a decline in cost sharing of over 75 dollars. However, cost sharing would have increased by between $75 and $150 for almost 7 percent of beneficiaries, and the increase would have been greater than $150 for 1.6 percent of beneficiaries.

The second and third columns present the actual dollars paid by beneficiaries for their inpatient care (less deductible and excess amounts on non-assigned claims), and what they would now pay under physician DRGs. The fourth column is simply the absolute dollar difference between columns (2) and (3) with negative numbers indicating decreases in liability. Finally, column 5 sums these differences across all beneficiaries in the group. The first beneficiary group (row 1) had paid on average of $541, a liability reduced under DRGs by $310. A substantial portion of this subsidy is borne by the middle group whose copayment increases only $10 per capita but, because of their absolute size, contribute an additional $1.3 million to the cost-sharing pool. Nevertheless, a very small number of beneficiaries would experience a tremendous increase in their out-of-pocket liability, almost double from $270 to $475 (see the last row).

Physician DRG payment could be considered as providing several advantages to beneficiaries. Once they have been placed in a DRG, their cost sharing is limited to the average for that DRG, rather than being, technically speaking, open-ended. For a given diagnosis, the level of cost sharing will be known with certainty. In essence, there is risk pooling for out-of-pocket beneficiary expenses among patients in the same DRG, a feature that may be of value to some beneficiares. However, because hospitalization for a specific

TABLE 6-1

CHANGES IN BENEFICIARY COST-SHARING UNDER PHYSICIAN DRGs

Change in Cost Sharing Amount (1)	% of Hospitalized Beneficiaries (2)	Average Cost-Sharing under Fee-for-Service (3)	Average Cost-Sharing under MD-DRGs (4)	Average Increase in Liability Per Beneficiary (5)	Total Increased Liability per Change Group (6)
Decrease of $150 or more	4.3%	$541	$231	-$310	-$ 2.1 million
Decrease of $75 to $150	5.4	290	185	-105	-0.8 million
Change of Less Than $75	81.8	108	118	10	1.3 million
Increase of $75 to $150	6.9	157	257	100	1.1 million
Increase of $150 or more	1.6	270	475	205	0.5 million
All Beneficiaries	100.0%	$142	$142	$ 0	$ 0.0 million

Source: North Carolina Part B claims, 1982.

DRG is not a frequent event for most beneficiaries, few would be aware of the actual difference in out-of-pocket payment levels between the current system and one based on DRGs. Nevertheless, for a small portion of beneficiaries, out-of-pocket payments may appear quite large relative to the level of services provided. In these instances, some type of "hold harmless" payments might be considered.

APPENDIX A

TABLE A-1

MEAN DRG PAYMENTS FOR HOSPITALS (CVs in parentheses)

DRG		Michigan	New Jersey	North Carolina	Washington
14	Specific Cerebrovasc Dis exc TIA	$ 4333 (0.99)	$3839 (1.01)	$2535 (1.06)	$3398 (1.12)
15	Transient Ischemic Attack	2305 (0.96)	1952 (0.90)	1379 (1.09)	1247 (0.98)
16	Nonspecific Cerebrovasc Dis w/ CC	3543 (1.03)	3109 (0.85)	--	3160 (2.04)
17	Nonspecific Cerebrovasc Dis w/o CC	2639 (1.02)	2138 (0.83)	1830 (1.06)	1572 (1.28)
39	Lens Procedures	1626 (0.55)	1218 (0.56)	1100 (0.48)	1206 (0.41)
89	Pneumonia Age 70+ &/or CC	3679 (1.03)	3304 (1.01)	2322 (1.10)	2731 (1.17)
90	Pneumonia Age 18-69 w/o CC	3300 (1.30)	2669 (1.06)	2193 (1.23)	2180 (1.62)
115	Perm Pacemaker Implant w/AMI or CHF	11284 (0.42)	9354 (0.51)	8241 (0.51)	9530 (0.46)
116	Perm Pacemaker Implant w/o AMI or CHF	8015 (0.48)	7187 (0.43)	6700 (0.50)	6564 (0.54)
127	Heart Failure & Shock	3255 (1.00)	2808 (0.95)	2260 (1.17)	2187 (1.08)
132	Atherosclerosis Age 70+ &/or CC	2718 (0.96)	2565 (1.45)	2021 (1.04)	1866 (1.06)
133	Atherosclerosis Age < 70 w/o CC	2418 (0.85)	2589 (1.33)	1883 (1.06)	1640 (0.75)
140	Angina Pectoris	2305 (0.78)	2078 (0.69)	1645 (0.87)	1531 (0.72)
148	Major Bowel Procs Age 70+ &/or CC	7834 (0.83)	7090 (0.87)	5426 (1.04)	6663 (0.83)
149	Major Bowel Procs Age < 70 w/o CC	7357 (1.01)	5833 (0.71)	4679 (0.81)	5341 (0.65)
182	Gastroenteritis & Misc. Dis Age 70 &/or CC	2163 (1.15)	1988 (1.10)	1371 (1.12)	1438 (1.18)
183	Gastroenteritis & Misc. Dis Age 18-69 w/o CC	2009 (1.11)	1748 (0.88)	1261 (0.96)	1171 (0.79)
195	Cholecystectomy w/CDE Age 70+ &/or CC	5571 (0.73)	5445 (0.76)	4479 (1.10)	5549 (0.77)
196	Cholecystectomy w/CDE Age < 70 w/o CC	4541 (0.79)	4498 (0.79)	3360 (0.73)	3266 (0.40)
197	Cholecystectomy w/o CDE Age 70+ &/or CC	4277 (0.88)	4139 (0.96)	3258 (0.80)	3896 (0.99)
198	Cholecystectomy w/o CDE Age < 70 w/o CC	3319 (0.72)	3018 (0.65)	2643 (0.66)	2564 (0.47)
209	Major Joint Procedures	6642 (0.45)	6023 (0.57)	5801 (0.52)	6021 (0.38)
294	Diabetes Age 36+	2663 (0.99)	2397 (1.01)	1695 (1.07)	1929 (1.19)
336	Transurethral Prostatectomy Age 70+ &/or CC	3115 (0.81)	2767 (0.77)	2165 (0.63)	2032 (0.71)
337	Transurethral Prostatectomy Age < 70 w/o CC	2609 (0.62)	2231 (0.70)	1886 (0.64)	1629 (0.53)

Source: Medicare Part A claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE A-2

GEOGRAPHIC VARIATION IN CONSULTATIONS PER ADMISSION BY DRG

DRG		Michigan	New Jersey	North Carolina	Washington
14	Specific Cerebrovasc Dis exc TIA	0.98	1.12	0.42	0.73
15	Transient Ischemic Attacks	0.81	0.84	0.36	0.36
16	Nonspecific Cerebrovasc Dis w/ CC	0.92	1.00	--	0.57
17	Nonspecific Cerebrovasc Dis w/o CC	0.80	0.87	0.37	0.35
39	Lens Procedures	0.22	0.47	0.12	0.04
89	Pneumonia Age 70+ &/or CC	0.51	0.67	0.20	0.26
90	Pneumonia Age 18-69 w/o CC	0.52	0.65	0.19	0.15
115	Perm Pacemaker Implant w/AMI or CHF	1.33	1.48	0.69	0.73
116	Perm Pacemaker Implant w/o AMI or CHF	1.01	1.35	0.57	0.47
127	Heart Failure & Shock	0.54	0.57	0.25	0.26
132	Atherosclerosis Age 70+ &/or CC	0.51	0.66	0.23	0.24
133	Atherosclerosis Age < 70 w/o CC	0.51	0.69	0.20	0.22
140	Angina Pectoris	0.41	0.43	0.15	0.19
148	Major Bowel Procs Age 70+ &/or CC	1.10	1.51	0.64	0.53
149	Major Bowel Procs Age < 70 w/o CC	0.99	1.38	0.49	0.40
182	Gastroenteritis & Misc. Dis Age 70 &/or CC	0.55	0.72	0.30	0.28
183	Gastroenteritis & Misc. Dis Age 18-69 w/o CC	0.64	0.72	0.33	0.34
195	Cholecystectomy w/CDE Age 70+ &/or CC	0.82	1.17	0.49	0.56
196	Cholecystectomy w/CDE Age < 70 w/o CC	0.63	0.98	0.43	0.15
197	Cholecystectomy w/o CDE Age 70+ &/or CC	0.67	1.11	0.44	0.33
198	Cholecystectomy w/o CDE Age < 70 w/o CC	0.55	0.80	0.38	0.17
209	Major Joint Procedures	0.90	1.12	0.64	0.31
294	Diabetes Age 36+	0.61	0.66	0.29	0.27
336	Transurethral Prostatectomy Age 70+ &/or CC	0.74	0.91	0.44	0.21
337	Transurethral Prostatectomy Age < 70 w/o CC	0.59	0.71	0.35	0.06

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE A-3

GEOGRAPHIC VARIATION IN USE OF ASSISTANT SURGEONS BY DRG (Percent of Admissions)

DRG		Michigan	New Jersey	North Carolina	Washington
5	Extracranial Vascular Procedures	28.1%	57.3%	31.7%	64.8%
39	Lens Procedures	28.0	75.6	2.3	35.9
110	Major Reconstruct Vasc Procs Age 70+ &/or CC	29.6	61.9	45.5	80.2
111	Major Reconstruct Vasc Procs Age < 70 w/o CC	23.4	55.7	53.0	80.5
115	Perm Pacemaker Implant w/AMI or CHF	6.5	23.8	2.1	17.6
116	Perm Pacemaker Implant w/o AMI or CHF	5.8	29.6	2.2	12.9
148	Major Bowel Procs Age 70+ &/or CC	32.1	55.0	41.7	81.5
149	Major Bowel Procs Age < 70 w/o CC	29.1	60.5	46.9	66.4
161	Inguinal/Femoral Hernia Procs Age 70+ &/or CC	27.9	42.9	17.0	54.9
162	Inguinal/Femoral Hernia Procs Age 18-69 w/o CC	25.2	37.8	14.7	60.5
195	Cholecystectomy w/CDE Age 70+ &/or CC	41.9	56.2	49.4	80.3
196	Cholecystectomy w/CDE Age < 70 w/o CC	41.2	60.7	51.6	76.9
197	Cholecystectomy w/o CDE Age 70+ &/or CC	41.9	61.0	47.9	75.4
198	Cholecystectomy w/o CDE Age < 70 w/o CC	42.1	59.6	45.5	76.4
209	Major Joint Procedures	27.0	51.4	56.6	82.3
210	Hip & Femur Procs Exc Major Joint Age 70+ &/or CC	19.4	41.6	14.5	53.2
211	Hip & Femur Procs Exc Major Joint Age 18-69 w/o CC	17.6	38.5	14.8	52.1
257	Total Mastectomy for Malig Age 70+ &/or CC	30.5	45.3	36.3	68.5
258	Total Mastectomy for Malig Age < 70 w/o CC	28.7	43.5	35.1	75.4
336	Transurethral Prostatectomy Age 70+ &/or CC	1.7	4.0	0.6	2.3
337	Transurethral Prostatectomy Age < 70 w/o CC	0.9	1.9	0.5	1.4
354	Nonradical Hysterectomy Age 70+ &/or CC	46.5	50.9	42.4	84.8
355	Nonradical Hysterectomy Age < 70 w/o CC	48.6	43.2	43.5	81.5

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

TABLE A-4

NUMBER OF ROUTINE HOSPITAL VISITS BY DRG

DRG		Michigan		New Jersey		North Carolina		Washington	
		Per Admission	Per Day	Per Admission	Per Day	Per Admission	Per Day	Per Admission	Per Day
14	Specific Cerebrovasc Dis exc TIA	16.4	1.03	18.1	0.95	15.5	0.96	13.4	1.06
15	Transient Ischemic Attacks	9.5	1.04	11.2	1.03	7.9	1.02	5.2	1.04
16	Nonspecific Cerebrovasc Dis w/ CC	13.0	1.01	16.1	0.95	--	--	12.2	1.14
17	Nonspecific Cerebrovasc Dis w/o CC	11.6	1.04	12.8	1.04	11.7	1.01	7.4	1.01
39	Lens Procedures	0.6	0.15	1.4	0.34	0.2	0.06	0.2	0.07
89	Pneumonia Age 70+ &/or CC	12.5	1.01	14.7	1.01	12.3	1.01	9.1	1.03
90	Pneumonia Age 18-69 w/o CC	11.1	1.03	12.2	1.04	10.5	1.02	6.7	0.99
115	Perm Pacemaker Implant w/AMI or CHF	16.0	0.81	28.2	1.39	18.0	1.15	10.9	0.79
116	Perm Pacemaker Implant w/o AMI or CHF	9.7	0.81	15.6	1.09	16.2	1.37	7.2	0.93
127	Heart Failure & Shock	11.4	0.98	12.5	0.94	10.4	0.95	8.1	1.03
132	Atherosclerosis Age 70+ &/or CC	10.2	0.97	11.7	0.97	10.0	0.93	6.4	1.00
133	Atherosclerosis Age < 70 w/o CC	8.1	0.94	10.6	0.96	7.8	0.91	4.4	0.94
140	Angina Pectoris	7.6	0.90	8.7	0.89	7.0	0.91	4.9	1.00
148	Major Bowel Procs Age 70+ &/or CC	12.7	0.61	19.3	0.82	10.4	0.52	7.8	0.50
149	Major Bowel Procs Age < 70 w/o CC	9.4	0.51	15.7	0.77	6.5	0.39	4.7	0.34
182	Gastroenteritis & Misc. Dis Age 70 &/or CC	9.4	1.02	10.8	1.03	8.4	1.01	6.1	1.02
183	Gastroenteritis & Misc. Dis Age 18-69 w/o CC	8.7	1.02	9.4	1.02	7.6	1.01	5.0	1.03
195	Cholecystectomy w/CDE Age 70+ &/or CC	10.9	0.66	15.9	0.79	9.5	0.56	6.7	0.49
196	Cholecystectomy w/CDE Age < 70 w/o CC	6.8	0.51	10.5	0.62	6.5	0.44	1.7	0.18
197	Cholecystectomy w/o CDE Age 70+ &/or CC	7.2	0.55	15.7	0.99	7.1	0.52	4.2	0.40
198	Cholecystectomy w/o CDE Age < 70 w/o CC	4.6	0.43	7.2	0.60	5.0	0.44	2.1	0.27
209	Major Joint Procedures	8.1	0.44	14.0	0.62	3.5	0.20	3.4	0.25
294	Diabetes Age 36+	11.8	1.03	13.4	1.01	10.5	1.00	8.2	1.05
336	Transurethral Prostatectomy Age 70+ &/or CC	4.8	0.47	8.1	0.68	3.3	0.32	1.8	0.26
337	Transurethral Prostatectomy Age < 70 w/o CC	4.0	0.46	4.7	0.49	2.3	0.26	0.6	0.11

Source: Medicare Part A and Part B claims from Michigan, New Jersey, North Carolina, and Washington, 1982.

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